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Progress Report on Nomenclature of Classes  
in New Classification System,

By Guy D. Smith

*G.D.S.*

In developing a system of nomenclature for the classes in the new system of soil classification, we seem to have only four alternatives. These are as follows:

1. To use numbers as names.
2. To retain existing names and modify definitions as necessary to fit the new concepts.
3. To coin a completely new system of nomenclature.
4. To use some combination of 2 and 3 above.

Use of Numbers

During the development of the system we have used numbers as a means of identifying the various classes, primarily because we wanted to focus discussion on the concepts of the classes. Had we coined names, the attention of the soil scientists would have been divided between the names and the concepts, and we believed this would be unwise. We have had sufficient experience with the use of numbers to realize their disadvantages. They are not connotative, and must be memorized. They can be used only by the few who use them frequently for they are quickly forgotten. They are unsuited for general use by other scientists and by laymen for that reason. The permanent retention of the numbers as names has not been considered seriously.

Retention of Existing Names

Existing classes of the 1938 classification have not been adequately defined, but more precise definitions could be written, with some modifications of the existing concepts, and existing names could be applied to the new classes.

The advantage of this procedure would be that fewer new names would need to be coined and learned.

The disadvantages seem more numerous and quite serious. The names of the 1938 system are partly substantives and partly adjectives. One can say Chernozem, but he must say Brown soils. It would seem reasonable to require that all names be substantives or that all be adjectives, so only part of the '38 names would be retained. There would be confusion in future reading if the names were redefined, for the reader would have to ascertain the author's usage of any name which had been redefined. The '38 names greatly overemphasize color, and if the color names are retained there will be examples where some of

the soils included in a class will not have the color of the name.

It would be possible to use the names given by Kubiena.\* These have been more precisely defined than those of the '38 system, and have been selected according to the rules given by Kubiena in The Soils of Europe, pages 17 to 21. Unfortunately, Kubiena's classes are seldom defined in the same terms as the classes of the 4th approximation, and it would seem that by following his rules we would wind up with essentially a complete system of new names.

#### Coining a Completely New System of Nomenclature

A start has been made by coining names for the classes of the 4th approximation to determine what kinds of problems will arise, and how they can best be met. A copy of a report from Professor John L. Heller, Head of Department of Classics, University of Illinois, is attached. Professor Heller has suggested that the categoric level of a class might be indicated by the number of etymological elements or roots (morphemes) and that the morpheme used as a name for a class in Category VII be repeated in all of its subdivisions in Category VI. The two morphemes in a given class in Category VI would then be repeated in all of its subdivisions in Category V. Thus in Category V each name would include three morphemes. It would appear that the main disadvantage of this system will be the number of syllables in the names of the classes in Category V. Since most of the morphemes contain two syllables, the names range from 4 to 6 syllables, and average about 5. This makes for difficult recognition and pronunciation.

I have experimented with a slightly different system which has different disadvantages. I tried to have common endings in Category VII and Category VI, but variable endings in Category V according to the nature of the horizons. In Category V, the central concept of a class without B or G horizons was given the ending "sol." Soils with textural B horizons have names ending with "os." Soils with characteristics associated with wetness have names containing the syllable "gley." If a color B is definitive, the name ends with "chrome." Other endings need to be coined for fragipans, laterite, and possibly other kinds of extra horizons. The table of tentative names according to the 4th approximation was not completed for all categories, but was as follows:

1. Prótoped, from

Gk. proto meaning first

1.1 Areñozem

L. arena meaning sand, sandy land

1.11 Areñosol

1.2 Grúmuzem

L. grumus meaning little hillock

1.21 Grúmusol

1.22 Grumárisol

L. grumus and L. aridus meaning dry

\* The Soils of Europe. Thos. Murby and Co. London.

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### 1.3 Protárizem

Gk. proto and L. aridus

1.31 Protárisol

1.32 Aripéetrosol

L. aridus and Gk. petros meaning stone

### 1.4 Protozem

1.41 Cryosol

Gk. Kryo meaning freezing

1.42 Portosol

L. porto, to convey

1.43 Anthrosol

Gk. anthropos meaning human beings

1.44 Protosol

1.45 Péetrosol

### 1.5 Protogleyzem

Gk. proto and Russian gley meaning blue clay in wet places

1.51 Salogley

L. salis meaning salt

1.52 Cryogley

1.53 Frigigley

L. frigidus for cool

1.54 ?

1.55 Protogley

## 2. Ariped

2.1 and 2.2 Árizem

2.11 Arios

L. aridus plus os

2.21 Arichróme

L. aridus plus Gk. chroma meaning color

2.3 Salárizem

2.31 Salárisol

L. salis for salt plus L. aridus

2.4 Calárizem

L. calcis for lime plus L. aridus

2.41 Calárisol

## 3. Nútriped

L. nutrio meaning to nourish

3.1 Calnútrizem

L. calcis plus L. nutrio

3.12 Calnútrisol

3.2 Planútrizem

L. planus for level plus L. nutrio

3.21 Planútrios

L. planus plus L. nutrio plus os

3.3 Nutriglém

3.31 Nutriglém

3.32 Nutriglém

3.4 Nutrizém

3.41 Nutrisól

3.42 Nutrisól

3.43 Nutriós

3.5 Brunizém

L. Brunus for Brown

3.51 Brunisól

3.52 Brunisólos

3.53 Brúnios

3.6 Nutárizem

L. nutrio plus L. aridus

3.61 Nutárisol

3.62 Nutários

4. Nátriped

L. natrium for sodium

4.1 Natárizem

L. natrium plus L. aridus

4.11 Natariós

4.2 Nátrizem

4.21 Nátrios

5. Podoped

Russian root for Podzol

6. Lixoped

L. lixiviatum meaning leached, or alkaline, from  
lix for ashes or lye

7. Siáloped

From chemical symbols Si and Al

8. Ferráloped (could also be Fealoped or Sesquiped)

From chemical symbols Fe and Al

9. Orgánoped

In Category IV the families would be given binomial names as (1) ortho families such as ortho-nutrisol (from Gk. *orthos*, true) and (2) as intergrade families, arenosolic-nutrisol. Other types of intergrades could be indicated by convention as arenosolous-nutrisol, etc., if necessary.

Professor Heller has discussed the disadvantage of this system in the attached report. It should be emphasized that in both systems the morphemes are tentative, and in many instances can probably be improved.

In Belgium, Professor R. Tavernier and Professor A. L. Leemans of the University of Ghent have been experimenting independently, and Professor Tavernier has written to me as follows:

"It is our impression that with the proposed system the names become much too long when one reaches category V and that as a result they will fail to be generally used. Therefore we have tried to start the name-giving at category VI. In this category we try to find names having only 2, exceptionally 3 morphemes. All the names in category V would have a common ending for each of the 8 groups. The first morpheme would be repeated in category V.

"To illustrate this I am giving here some tentative names for group I. The common ending for this group in category VI could be e.g. -os. Then we could have:

1.1 = psammos  
1.2 = pellos  
1.3 = xeros  
1.4 = protos (or udos?)  
1.5 = gleyos

"For group II the common ending in category VI could be e.g. ert:

2.1 = arisert  
2.2 = chromsert  
2.3 = halosert  
2.4 = calisert

and so on for other groups.

"In category V we could have:

1.21 = melapel (or pachypel)  
1.22 = aridopel (or leptopel)  
  
1.31 = regoxer  
1.32 = lithoxer  
  
1.41 = cryoprot  
1.42 = anthroprot  
1.43 = agroprot  
1.44 = regoprot  
1.45 = lithoprot (or petroprot)  
  
1.51 = halogley  
1.52 = cryogley  
1.53 = frigigley  
1.54 = orogley  
1.55 = neogley

"This, I hope will give you an idea about the system we are trying to work out presently. It is not clear yet if we will be able to work it out for the complete scheme."

A short meeting has been proposed this summer in Ghent to discuss the alternatives and the relative usefulness of each approach. If agreement can be reached, we will try to find alternative morphemes, and will circulate a list of alternative names for criticism.

Extracts from  
Suggestions for a Terminology of Soils

By Professor John L. Heller (Jan. '56)

First, for the general requirements of the system. I take it that it is highly desirable that each name should show at a glance to which one of the three highest categories it refers. Your suggestion was to use a distinctive suffix for each category, -ped or -bod for VII, -zem for VI, and -sol (or -gley or -lix) for V. This would be possible, but a second requirement seems to me equally important, that each name in a lower category should show at a glance the group in the higher category under which it is included. This your present suggestions do not do at all consistently. For example, the names under 1 appear thus:

<u>Category VII</u>	<u>Category VI</u>	<u>Category V</u>
1. Protoped	1.1 Arenozem	1.11 Arenosol
	1.2 Grumuzem	1.21 Grumusol 1.22 Grumarisol
	1.3 Protarizem	1.31 Protarisol 1.32 Arilithosol (? Litharisol)
	1.4 Protozem	1.41 Cryosol 1.42 Portosol 1.43 Anthrosol 1.44 Protosol 1.45 Petrosol
	1.5 Protogleyzem	1.51 Salogley 1.52 Cryogley 1.53 Frigigley 1.54 -?-gley 1.55 Protogley

Here the names in Category V do key into those of Category VI, except for 1.4, and those of VI, except for 1.1 and 1.2, into V. But the exceptions are disorderly, and the names in V rarely show that they belong under Proto- in VII (only at 1.31, 1.44, and 1.55).

Both objects could in fact be attained, using distinctive suffixes, only by having 2-element names for VII, 3-element names for VI, and 4-element names in V. Thus, where letters represent etymological elements, or morphemes (as they would be called in linguistics),

we could have:

<u>Category VII</u>	<u>Category VI</u>	<u>Category V</u>
1. A-ped	1.1 a A-zem	1.11. $\alpha$ a A-sol
	1.2 b A-zem	1.21 $\beta$ b A-sol
	1.3 c A-zem	1.22 $\epsilon$ b A-sol
	1.4 d A-zem	1.31 $\zeta$ c A-sol
	1.5 e A-zem	1.32 $\kappa$ c A-sol
2. B-ped	2.1 m B-zem	1.41 $\alpha$ d A-sol
etc. for	2.2 n B-zem	1.42 $\checkmark$ d A-sol
9 prefixes	etc.	1.43 $\xi$ d A-sol
		etc.

At this point it becomes obvious that the names in Category V will be intolerably long, and that the distinctive suffixes are an encumbrance. We could do better without them. My first proposal, then, is that we let the number of morphemes in a name indicate to which category the name refers. The nine names in Category VII would consist of single etymological elements, or morphemes; names in Category VI would contain two morphemes, the second of which would be the same as the morpheme denoting the group in VII to which they belong; names in Category V would contain three morphemes, the last two of which would repeat the name of the group in VI to which they belong. That is, the system of names would accomplish exactly what your system of numbers does, but in reverse order. Thus:

<u>Category VII</u>	<u>Category VI</u>	<u>Category V</u>
1. A	1.1 aA	1.11. $\alpha$ aA
2. B	1.2 bA	1.21 $\beta$ bA
3. C	1.3 cA	1.22 $\epsilon$ bA
4. D	1.4 dA	1.31 $\zeta$ cA
etc.	1.5 eA	1.32 $\kappa$ cA
	2.1 mB	1.41 $\alpha$ dA
	2.2 nB	1.42 $\checkmark$ dA
	etc.	1.43 $\xi$ dA
		etc.

Or, to illustrate with actual names, all of which, of course, are merely tentative and subject to change (etymologies will be given below):

1. Arga	1.1 Arenarga	1.11 Primarenarga
2. Xera	1.2 Grumarga	1.21 Pachygrumarga
3. Chresta	1.3 Aridarga	1.22 Leptogrumarga
etc.	1.4 Humidarga	1.31 Mollaridarga
(These are Latin plurals; English plurals: Args Xeres Chrests)	1.5 Madidarga	1.32 Duraridarga
	2.1 Textoxera	1.41 Frigumidarga
	2.2 Chromoxera	1.44 Mollumidarga
	etc.	1.45 Durumidarga
		etc.

Admitting that the names in Category V are a bit unwieldy, I think the main question to be decided is this: Do the advantages of

this system outweigh the desirability of the shorter but unsystematic names previously suggested?

(April '56)

I am very much pleased with the general idea of Professor Tavernier and Leemans for having common endings in Category VI for each of the nine groups, and in Category V to indicate the subdivisions of the groups in VI by using the first element of the name in VI as the final element of the name in V. I also applaud the preference for Greek morphemes over Latin, and think orogley is particularly happy at 1.54. Should not pellos at 1.2 be spelled pelos?

I would also drop the Latin endings. All we need to ensure is that plurals can be formed easily in the respective languages; for this reason I would object strongly to -os as a distinctive ending for group 1. It would too easily be taken for a Greek inflectional ending and might tempt users to form a plural in -oi or -i. It would be best to treat all names as singulars, and have them end with a bare stem, preferably a consonant. The names can, of course, be treated either as adjectives or nouns: "Arg soils" or "Argo," etc.

But if we have to find nine distinctive endings for Category VI, why not take them from the names in Category VII and thus tie together Categories VII and VI in the same way that the groups in Categories VI and V are tied together? See my new suggestions below for the first three groups in all three categories. I have found Dr. Smith's suggestions very helpful.

The system will not be perfect, of course, with respect to indicating at a glance both to what category and to what group a given name belongs. For example, holocal at 2.41 and pliocal at 3.11 will share the same ending, though they belong to different groups; so also regoxer at 1.31 and histoxer at 3.62, etc. But perhaps this will make no great difficulty, so long as we do not inadvertently create homonyms. (The -gleys at 1.5X and 3.3X do not conflict, but we will have to guard against having hologley at both 6.51 and 7.11). Homonymy between Categories VI and V can be mitigated (as at 2.1 vs. 3.62) by the device of capitalizing names in Categories VII and VI but not in Category V.

I think, then, that in this system we will have a reasonable and workable compromise between the need to pinpoint the category and group and to avoid long names.

1. Arg	1.1 Psammarg	1.11 holopsam*
	1.2 Grumarg or Pelarg	1.21 pachygrum or pachypel 1.22 leptogram or leptopel
	1.3 Xerarg	1.31 regoxer (?regixer) 1.32 lithoxer
	1.4 Udarg	1.41 cryud 1.42 enthetud (enthal- 'put in') 1.43 anthropud
	1.5 Gleyarg	1.44 regud 1.45 lithud 1.51 halogley 1.52 cryogley 1.53 frigigley 1.54 orogley 1.55 neogley
2. Xer	2.1 Histoher	2.11 holohist* (Gk. histo- = L. texti-)
	2.2 Chromoxer	2.21 holochrom*
	2.3 Haloxer	2.31 holohal*
	2.4 Calixer	2.41 holocal*
3. Chrest	3.1 Calichrest	3.11 pliocal 3.12 miocal
	3.2 Platychrest or Planichrest	3.21 holoplat* or holoplan*
	3.3 Gleyochrest	3.31 anhistogley 3.32 histogley
	3.4 Melachrest	3.41 anhistomel 3.42 aphistomel 3.43 parhistomel**
	3.5 Brunichrest	3.51 anhistobrun 3.52 aphistobrun 3.53 parhistobrun**
	3.6 --	3.61 anhistoxer 3.62 histoxer

\* - Using holo- wherever no divisions are made.

\*\* - Reserving hyphisto- for 8.42 & 8.53

A few other comments, looking ahead:

(1) I would now shorten my names for the other groups in Category VII as follows:

4. Sold 5. Spod 6. Lix 7. Lyt (or Lyte) 8. Plinth 9. Lim  
But I set no great store by any of them.

(2) Compound names in Category V will certainly be necessary throughout Group 5, where in every case the critical distinction involves two factors. Thus for 5.1 we shall have to have something like:

5.11 With permafrost and mottled B	cryostigmo-
5.12 With permafrost and no mottling in B	cryastigmo-
5.13 Without permafrost and with mottled B	acryostigmo-
5.14 Without permafrost and without mottled B (if <u>stigmo-</u> is at all acceptable for 'mottled').	acryastigmo-

But these will be our longest names. The distinctions in 9, e.g., can be reduced to:

9.11 With <u>fibrous</u> peat	?
9.12 With <u>aggregated</u> peat	?
9.13 With <u>fine fibrous</u> peat	?
9.14 With permafrost	cryo-

(3) In Category IV, I would recommend the substitution of crypto- for the present sepelio-. We would then have, using x and y as names in Category V:

ortho-x  
crypto-x  
x-y (intergraded)





